concens

Elegance - in motion

ATTUATORI CONCENS

GB

Data Sheet
con35
Linear In-line Actuator

concens
- excellent electric actuators

Data

Motor
12/24 VDC power supply, permanent magnet motor

Type (gear ratio)		con35 (5)	con35 (14)	con35 (19)	con35 (27)	con35 (51)	con35 (71)
Maximum load	[N]	120	400	600	900	1600	2200
Speed at maximum load	[mm/s]	33	16	12	7.5	4	3

Recommended max. current: 12 VDC = 3.6 A / 24 VDC = 1.8 A

Max. Static Load*)/ Self-locking force ■PA Brackets: 2000 N ■Alu Brackets: 5400 N

*) Depending on stroke length for push-applications

Temperature ■Operation: -5ºC to +70ºC ■Storage: -40ºC to +70ºC

Protection class IP66

Cable specification 1m, 2×0.25mm^2 (AWG22), diameter ~ 4mm, black/grey

Materials

Motor and actuator tube	Powder coated steel
Piston rod	Aluminium
Front and rear brackets	PA

Duty cycle Max. 10% or 2 minutes in use followed by 18 min. rest

Color Black (RAL 9005) is standard

Stroke length/weight

Stroke	[mm]	50	100	150	200	250	300	350	400	500	750
Weight	[kg]	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.8	2.3

Max. load limited to 1000 N for stroke lengths ≥ 500 mm.
Actual weight may vary depending on model and options selected.

Options

- Stainless steel versions (AISI 304 or AISI 316)
- Front and rear brackets in aluminium or stainless steel
- Front and rear brackets with clevis
- Brackets with spherical bearings
- Piston rod available in black (equivalent to RAL 9005)
- Hall sensors for positioning and/or synchronization
- IP68/IP69K (additional 11 mm to end-to-end dimensions, gear ratio 1:5 not available) *)
- Connector types (Molex 5557 / DIN 8 pole / Phono / Others)
- Low Noise
- ATEX zone 22, group II 3 D approval
- Certificate EN/UL/CSA 60.601
- Eskimo version (-40ºC to +70ºC)
- Other cable lengths

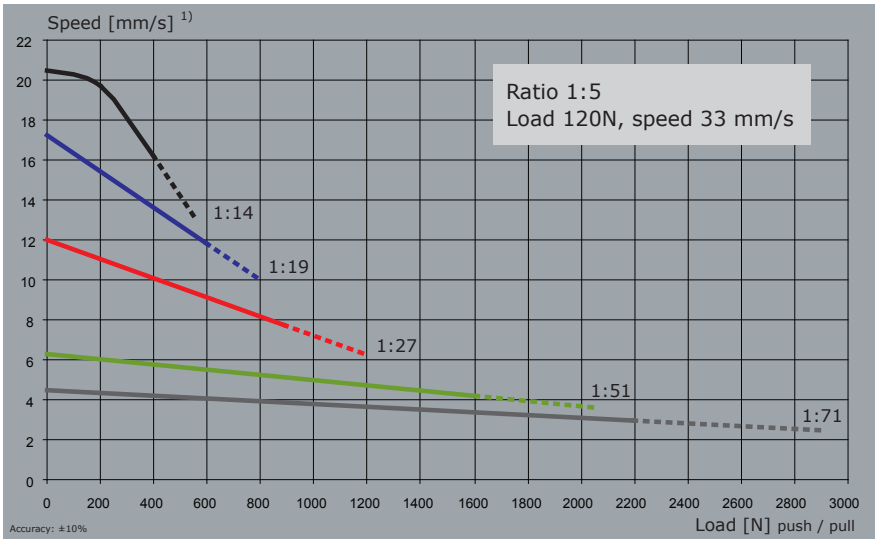
*) The dust and water sealing of IP68/69K actuators might affect their performance in lower gear ratios.

On request

- Available in all RAL colors
- Other stroke lengths available
- Customised front, rear brackets and built in measures

Contact Concens for any special requirements.

Speed/force

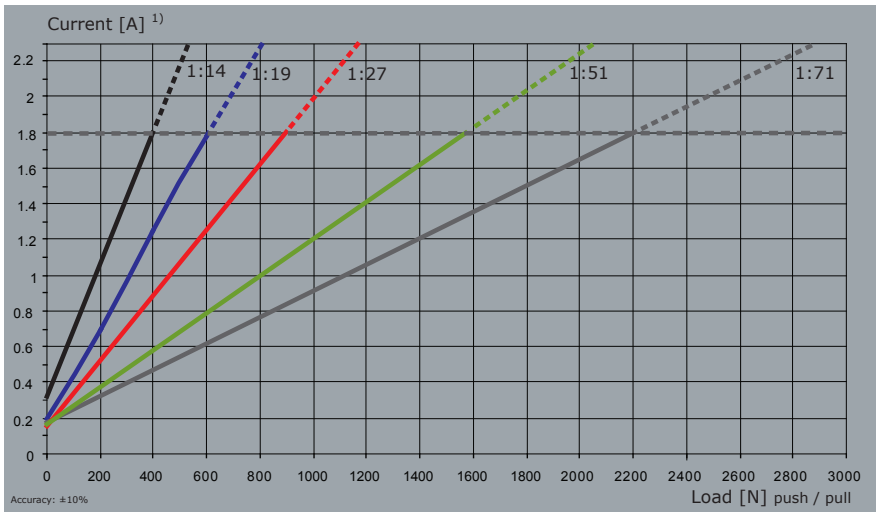


Force/current

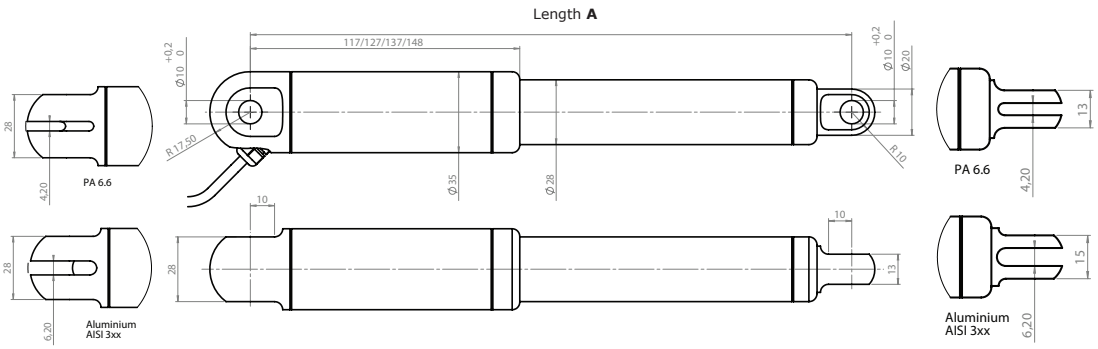
For 12 V DC power supply multiply the current values with a factor 2.

Use in the dashed area is not recommended.
Please contact Concens for further information.

1) At ambient temperature T=25 ºC



Dimensions



Build length **A** [mm]	Standard	Clevis rear	Hall	UL	IP68/IP69K
Gear ratio 5, 14, 19, 27	160+s*	+10	+10	+10	+11
Gear ratio 51, 71	170+s*	+10	+10	+10	+11

Axial backlash: ±0.5 mm
General dimensional variation: ±1 mm

* s = stroke length

stroke length > 500 mm: + 7 mm
stroke length > 700 mm: + 42 mm

Precautions

Power supply without over current-relay or other current switch-off devices can cause serious damage to the actuator at mechanical end-stop or if the actuator is overloaded in another way.
Radial forces might have an adverse effect of the performance of, or lead to damage to the actuator.

GB

Data Sheet
con50
Linear In-line Actuator

concens
- excellent electric actuators

Data

Motor
12/24 VDC power supply, permanent magnet motor

Type (gear ratio)		con50 (4)	con50 (14)	con50 (17)	con50 (24)	con50 (49)	con50 (84)
Maximum load	[N]	500	1750	2200	3100	4500	4500
Speed at maximum load	[mm/s]	70	20	17	12	6.0	4.0

Recommended max. current: 12 VDC = 16 A / 24 VDC = 8 A

Max. Static Load*)/ Self-locking force ■PA Brackets: 4700 N ■Alu Brackets: 16800 N

*) Depending on stroke length for push-applications

Temperature ■Operation: -5ºC to +70ºC ■Storage: -40ºC to +70ºC

Protection class IP66

Cable specification 1m, 2×0.75mm^2 (AWG18), diameter ~ 6mm, black/grey

Materials

Motor and actuator tube	Powder coated steel
Piston rod	Stainless steel
Front and rear brackets	PA

Duty cycle Max. 10% or 2 minutes in use followed by 18 min. rest

Color Black (RAL 9005) is standard

Stroke length/weight

Stroke	[mm]	50	100	150	200	250	300	350	400	500	750
Weight	[kg]	2.1	2.3	2.6	2.8	3.1	3.3	3.6	3.8	4.3	5.6

Type con50 max. load limited to 2000 N for stroke lengths ≥ 500 mm.
Actual weight may vary depending on model and options selected.

Options

- Stainless steel versions (AISI 304 or AISI 316)
- Front and rear brackets in aluminium or stainless steel
- Front and rear brackets with clevis
- Brackets with spherical bearings
- Hall sensors for positioning and/or synchronization
- IP68/IP69K (additional 14 mm to end-to-end dimensions) *)
- Connector types (Molex 5557 / DIN 8 pole / Phono / Others)
- Low Noise
- ATEX zone 22, group II 3 D approval
- Certificate EN/UL/CSA 60.601
- Eskimo version (-40ºC to +70ºC)
- Other cable lengths

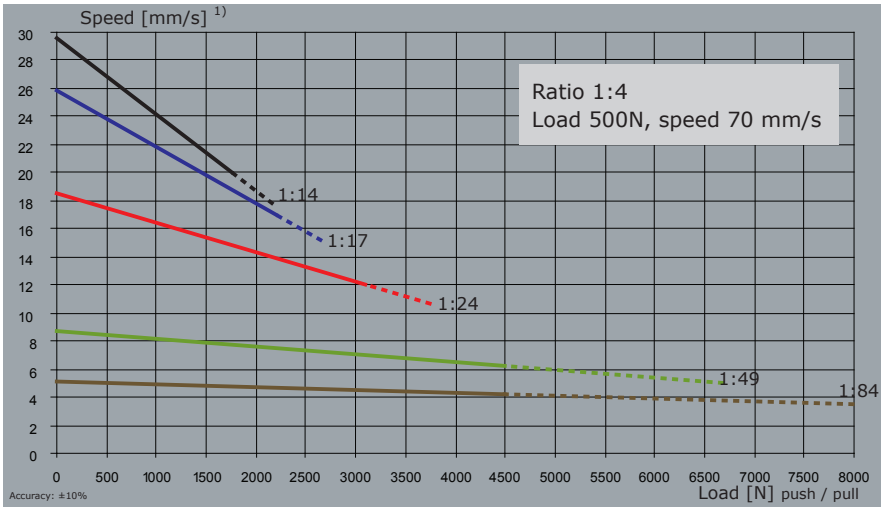
*) The dust and water sealing of IP68/69K actuators might affect their performance in lower gear ratios.

On request

- Available in all RAL colors
- Other stroke lengths available
- Customised front, rear brackets and built in measures

Contact Concens for any special requirements.

Speed/force



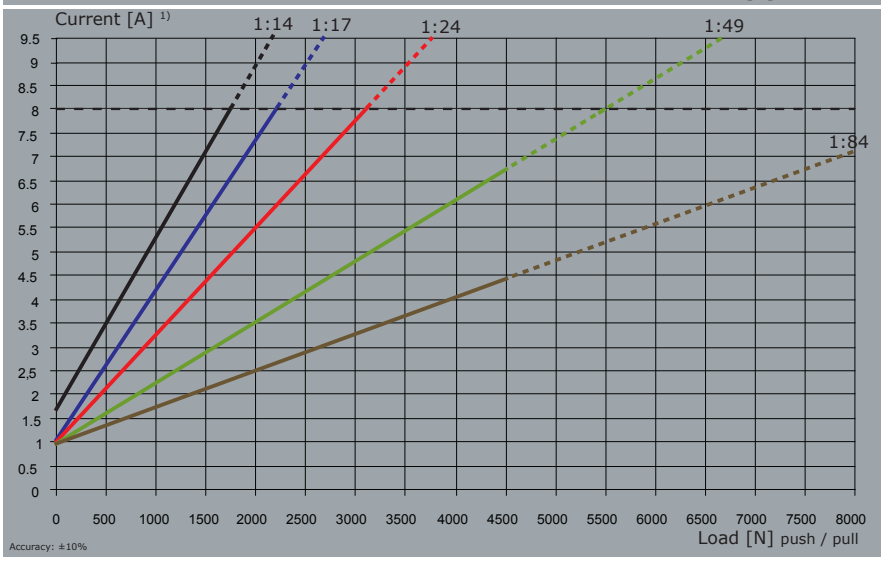
Force/current

For 12 V DC power supply multiply the current values with a factor 2.

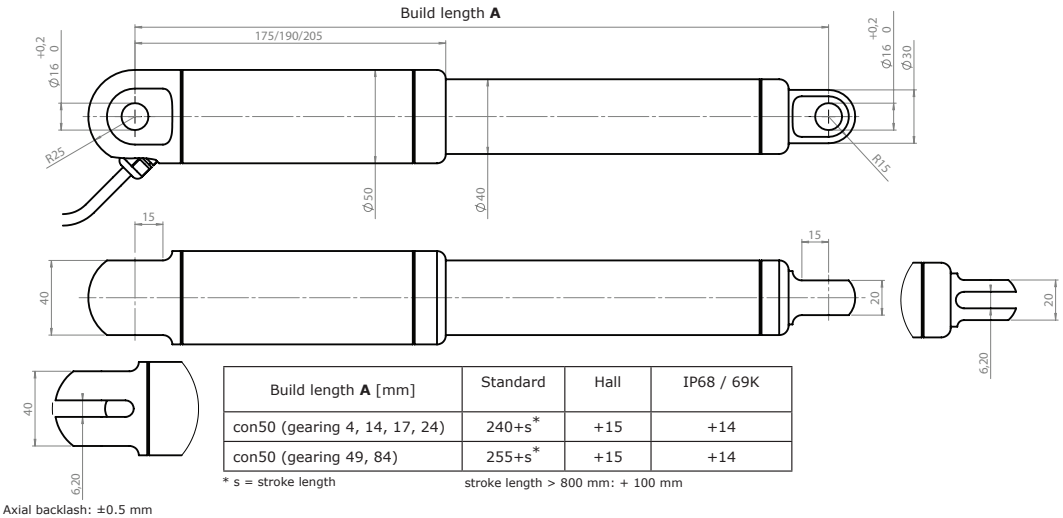
Use in the dashed area is not recommended. Please contact Concens for further information.

Max. 7A when used in connection with C3 system.

1) At ambient temperature T=25 ºC



Dimensions



Build length **A** [mm]	Standard	Hall	IP68 / 69K
con50 (gearing 4, 14, 17, 24)	240+s*	+15	+14
con50 (gearing 49, 84)	255+s*	+15	+14

* s = stroke length

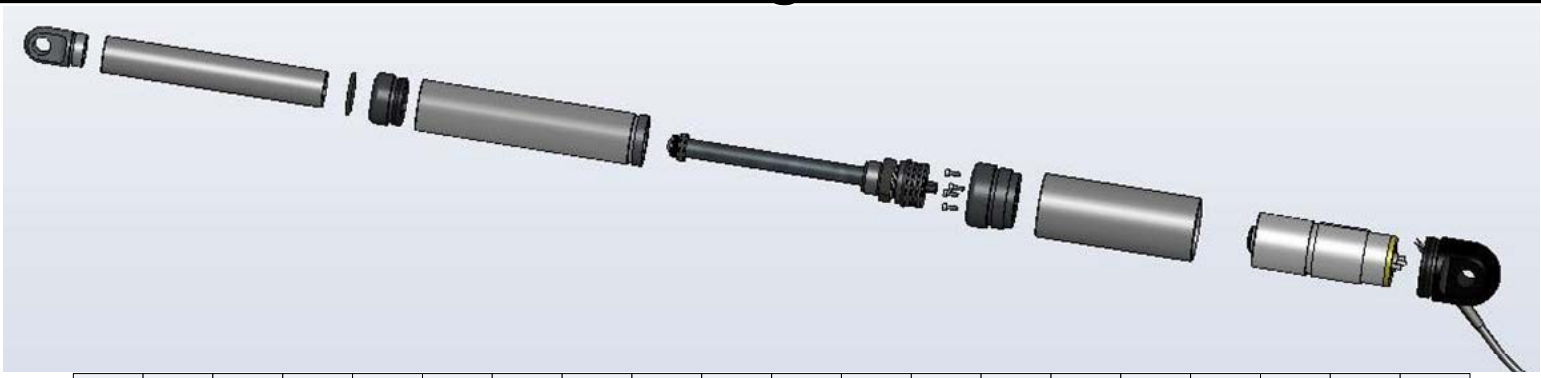
stroke length > 800 mm: + 100 mm

Axial backlash: ±0.5 mm
General dimensional variation: ±1 mm

Precautions

Power supply without over current-relay or other current switch-off devices can cause serious damage to the actuator at mechanical end-stop or if the actuator is overloaded in another way.
Radial forces might have an adverse effect of the performance of, or lead to damage to the actuator.

Actuator Configuration Guide



"Default" con35 ->	3	5	0	1	0	0	-	2	7	3	2	1	1	-	0	0	0	0	0	0
"Default" con50 ->	5	0	0	1	0	0	-	2	4	3	3	1	0	-	0	0	0	0	0	0
	Product Series	**Stroke Length**					**Low Noise**	**Gearing**		**Vol-tage**	**Pitch**	**Cable length**	**Con-nector**	**Hall**	**Steel IP**	**Brac-kets**	**Tube Color**	**Ring Color**	**Type ID**	

'35' = con35
'50' = con50

00-99
(00 = all standard)

Standard:
'0050' = 50 mm
'0100' = 100 mm
'0200' = 200 mm
'0500' = 500 mm
Special:
'0150' = 150 mm
'0250' = 250 mm
'0300' = 300 mm
'0350' = 350 mm
'0400' = 400 mm
'0750' = 750 mm
'1000' = 1000 mm
Custom:
'xxxx' = xxxx mm

'-' = Standard
'+' = Low Noise

Standard:

Con35	con50
05	04
27	**24**
71	84

Special:

con35	con50
14	14
19	17
51	49

Standard:
'1' = 12Vf
'3' = 24Vf
Special:
'4' = 24V
'5' = 36Vf
'6' = 36V

Standard:
'2' = 2 mm std. nut (35)
'3' = 3 mm std. nut (50)
Special:
'4' = 2 mm "Slide Nut" (35)

1-9 m
(default is 1 m)

'-' = without hall sensor
'+' = with hall sensor

Standard:
'0' = Black cable, no connector (50)
'1' = Grey cable, no connector (35)
Special:
'2' = Black cable, Molex Minifit connector
'3' = Grey cable, Molex Minifit connector
'4' = Black cable, DIN connector
'5' = Grey cable, DIN connector

Standard:
'0' = PA
'2' = Alu
Special:
'1' = PA with slash
'3' = Alu with slash
'4' = AISI316
'5' = AISI316 with slash

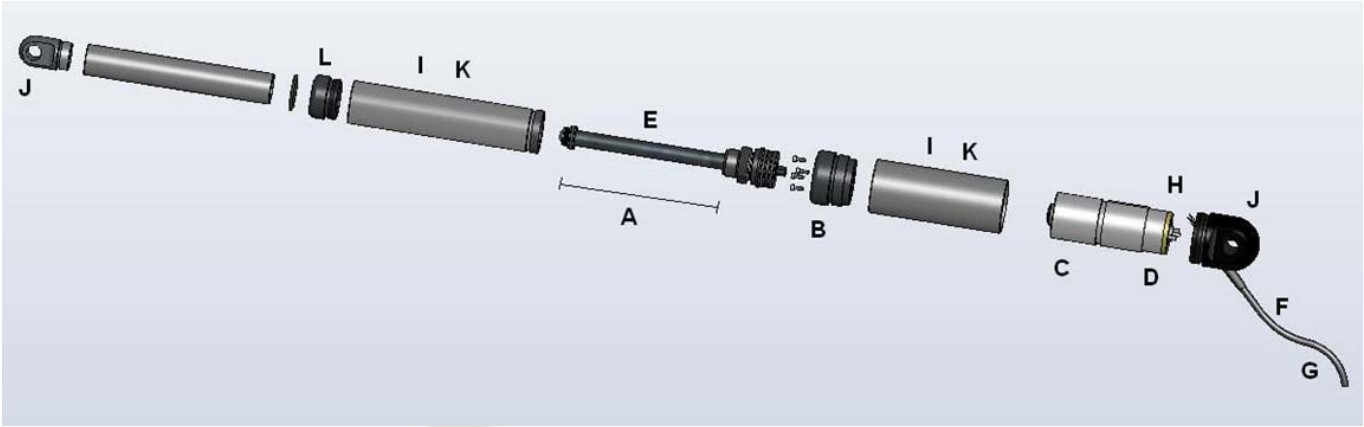
Standard:
'0' = Std. steel, IP66
Special:
'1' = AISI304, IP66
'2' = AISI316, IP66
'3' = AISI304, IP68
'4' = AISI316, IP68
'5' = AISI316, IP69K

Standard:
'0' = Black
Special:
'1' = Grey
'9' = Stainless steel

Standard:
'0' = Black, RAL9005, gloss 25
Special:
'1' = Grey, RAL9006, gloss 30
'3' = White, RAL9003, gloss 70
'9' = Stainless steel

Notes:
1) Values in **bold** are default values (used if nothing is specified)
2) Special requirements must be marked as 'x'
3) Type ID equals '00' for all standard actuators

Actuator Configuration Vocabulary



	A	B	C	D	E	F	G	H	I	J	K	L	
Product Series	Stroke Length	Low Noise	Gearing	Vol-tage	Pitch	Cable length	Cable/ Conn.	Hall	Steel IP	Brac-kets	Tube Color	Ring Color	Type ID

Two series are available from concens: con35 & con50

Type ID is used to specify special requirements. Standard actuators have type ID = 00

Stroke length is defined as the maximum length of movement the actuator can handle. Not to be mixed with 'built-in length'.

concens' patented low noise option reduces the noise level considerably.

The gearing of the actuator determines speed and maximum force.

Choose between 12, 24 or 36 volts. 'f' (fast) motors have higher torque and speed, but is recommended for max 10% duty cycle.

Standard pitch of lead screw is 2 mm for con35 and 3 mm for con50. However, 3 mm pitch is available for con35 upon request. Concens patented 'slide nut' is availble for con35 (pitch = 2 mm).

end' i.e. including connector (if mounted). Special lengths are specified under Type ID

concens actuators come with black or grey cable and are delivered without connectors as standard. Molex MiniFit or DIN connectors can be mounted for C3 system and Logic Data control boxes. Other special connectors can be mounted according to customer requirements.

Hall sensors are used to keep track of the position of the actuator.

Tube material is painted standard steel (IP65) or stainless steel AISI304/ AISI316 (IP65, IP68 or IP69K).

Front and rear brackets are available in PA, aluminum and stainless steel. They can be with or without slash (clevis). Special brackets can be made upon request

For IP65 actuators the piston ring (PA) can be black or grey.

Standard steel actuators are delived with black motor- and actuator tube as standard. Other RAL colors are available on request.

Data Sheet Hall

Option for con35 and con50

Hall

Option for con35 and con50 Control Unit	Possibility to precise control the start and end position of the actuator and the displacement during application. Furthermore, Hall gives the possibility to operate 2 or more actuators in parallel.
Built-in measure	con35 – additional 10 mm (see data sheet for con35) con50 – additional 15 mm (see data sheet for con50)
Cable	con35 - 1m, 8x0.14mm2 (6xAWG26), diameter ~ 5mm, black/grey con50 - 1m, 8x0.34mm2 (8xAWG22), diameter ~ 7mm, black/grey Maximum recommended cable length is 2.5 m Contact Concens for other cable lengths in special applications
Concens control units	C3 system (see data sheet for C3) Logic Data (see data sheet for Logic Data) C2-20 Concens servosystem
Customer Control Unit	PLC or likewise

Hall Input/ Output

Information for customer's control unit:

Wiring

GREY Cable colour **con35 con50**	Yellow	Green	Red	Blue	Brown+Pink	White + Grey
Function	Hall A output open collector	Hall B output open collector	+5 V dc Hall	0V Hall	Actuator +	Actuator -

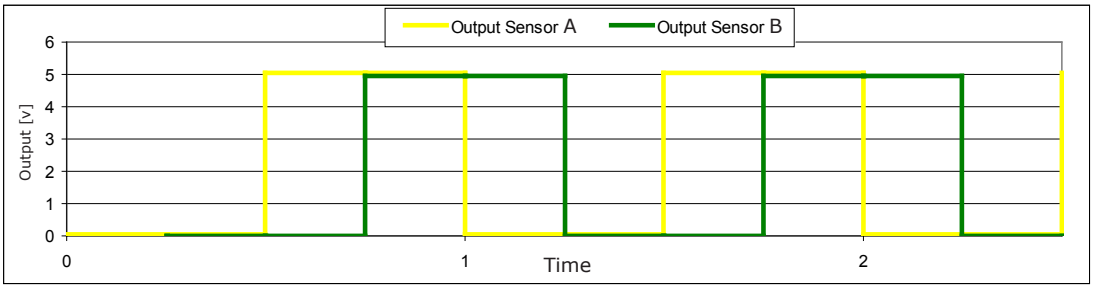
BLACK Cable colour **con35**	Yellow	Green	Red	Orange	Brown	Black
Function	Hall A output open collector	Hall B output open collector	+5 V dc Hall	0V Hall	Actuator +	Actuator -

BLACK Cable colour **con50**	Yellow	Green	Red	Blue	Brown+Orange	Black + Purple
Function	Hall A output open collector	Hall B output open collector	+5 V dc Hall	0V Hall	Actuator +	Actuator -

Warning: Power input in red wire must ***never*** exceed 5 V dc

Note: In a customer designed control unit external pull-up resistors from Hall signals to +5 V DC are necessary. Resistor values of 1 kΩ are preferred.

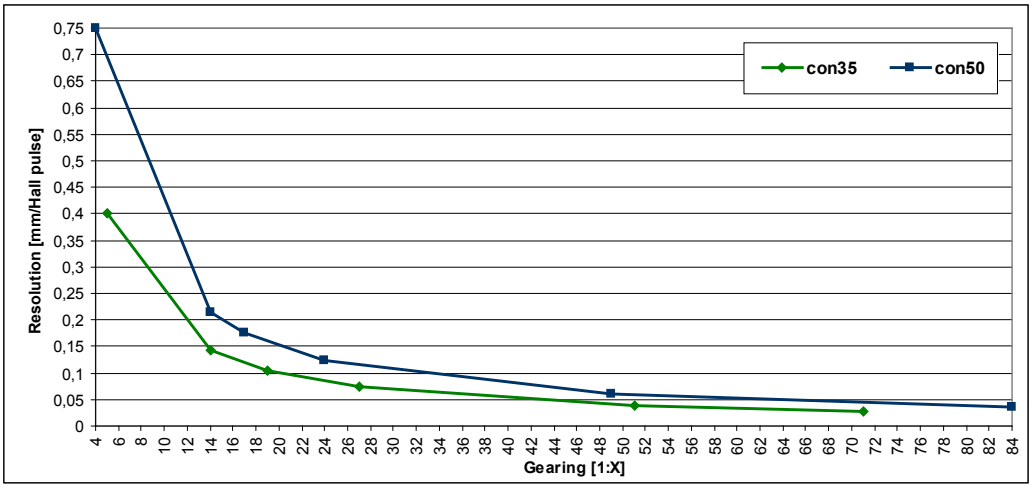
Hall signal output yellow and green wire. 1/4 cycle delay between output sensor A and B.
Order depends on displacement direction of the actuator.



Hall resolution

C3 + con35		C3 + con50	
Gear ratio	mm/ pulse	Gear ratio	mm/ pulse
5	0.4	4	0.75
14	0.1429	14	0.2143
19	0.1053	17	0.1765
27	0.0741	24	0.1256
51	0.0392	49	0.0612
71	0.0282	84	0.0357

Note: Table shown for C3 controller. Resolution is 4 times better when using C2-20 servo controller.



C3 concens control concept

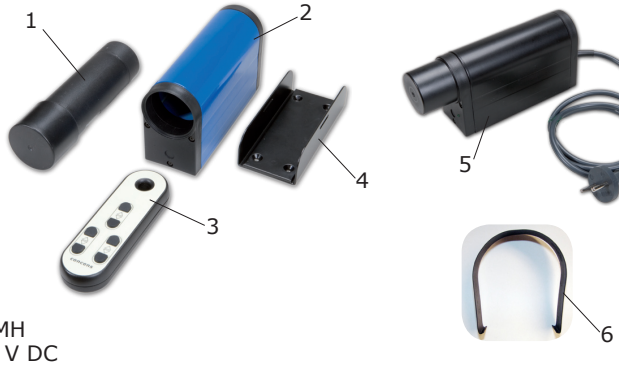
The C3 system is a versatile solution for control of concens and other actuators. The unique design, strong power supply system and the option of controlling multiple actuators makes the C3 system attractive in various applications

C3 System

Components

1. Battery (573 g)
2. Control box (491 g)
3. Remote control (93 g)
4. Bracket (318 g)
5. Battery charger box (500 g)
6. Safety clip

Black (RAL 9005) is standard colour and beige (Pantone 454) foil on remote control



Battery (1)

Type	NiMH
Power supply	24 V DC
Maximum continuous current	7 A (Short-time peak current 10 - 20 A)
Capacity	1400 mAh
Low-capacity warning	Sound signal

Control box (2)

Number of remotes	A C3 control box can recognize ID's from max. 10 remotes
Connector type	Molex Mini-fit 5559
Number of outputs	Up to 5 (4 actuators + 1 wired remote or emergency stop output)
IP code standard	Standard IP50 (remark: IP65 available as option)
Choice of different	Adjusted by concens prior to delivery on customer request.

Options for one control box

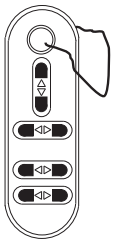
No. of actuators	Options (Both wired and wireless solutions)		
1	1 Independent		
2	2 Independent	2 Parallel	
3	3 Independent	2 Parallel+ 1 independent	
4	4 Independent	2×2 Parrallel	2 Parallel + 2 Independent

Actuators running in parallel requires Hall (see Hall data sheet)

Remote control (3)

Wired solution

Standard cable length: 0.55 m - 2.30 m (retracted - extracted)

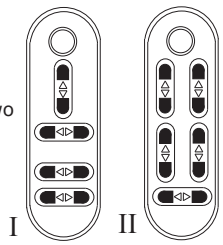


Choice of black cord for eye in remote control.

Wireless solution

Frequency: 2.4 GHz communication frequency

Two basic designs for location of buttons. Customer can select any button location and design from the two standard designs:



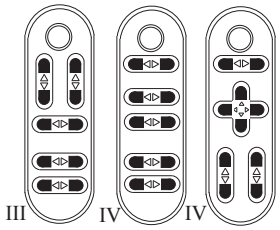
Remote control battery cover

C3 concens control concept

Bracket (4)	Part of control box delivery	Magnetic coupling with control box (patent application pending)
Battery charger (5)	Power supply Charging time Mains connector Battery change Charging signal Full capacity signal	110 or 240 V AC 5 - 8 hours European / UK / US type Easy revolving fastening (patent application pending) Green light flashing Continous green light
Patent	Patent application	PCT WO 2005/109563
Options	Emergency stop on battery	
	Customised colour and logo on foil for remote control	
	Protection class IP 65	
	Precise control of actuator movement and location of end stops.	Hall sensor in actuator (see Hall data sheet)
	Customised colour of control box and battery charger	
	Customised remote design	Customer can select any button location and design from three options:

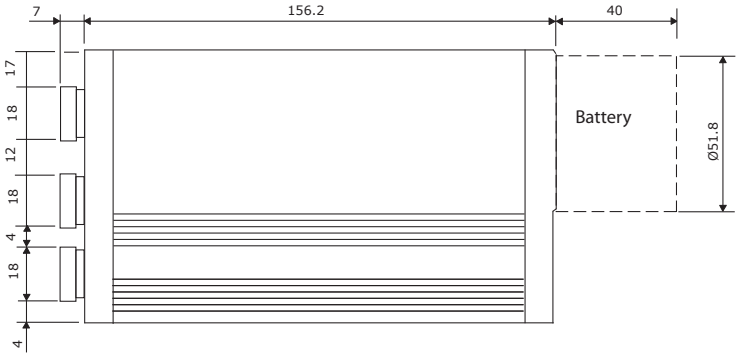

Emergency stop on battery

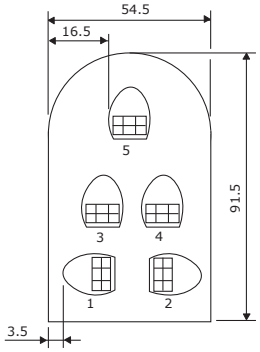

Examples

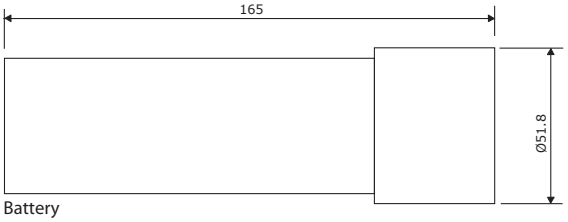


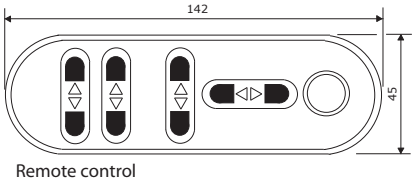
Multiple system design
An unlimited number of control boxes can be setup identically and controlled by one remote control (only wireless).

Dimensions





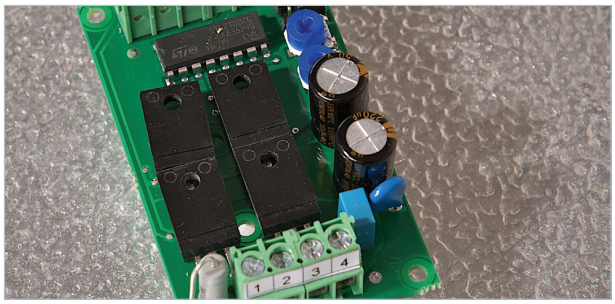




concens
- excellent electric actuators

User Manual
C2-04
Control and protection of linear actuator con35

Version 1.2 - September 2011



INTRODUCTION

C2-04 is developed for controlled ON-OFF driving and direction change of the con35 actuator. C2-04 has advanced current limit features. It limits the motor current in start-up and jam-situations and in that way protects the motor and mechanics. C2-04 also has an error output indicating error/over current status.

The acceleration ramp time for start-up is adjustable to suit each application. In other words the motor voltage is slowly rised to give a smooth start-up. When the control is off, the motor is dynamically braked with so called short-circuit braking, i.e. the motor poles are connected together. The reverse and forward commands can be set with positive and negative control.

The freewheel command sets motor run free. Freewheel overrides forward and backwards commands.

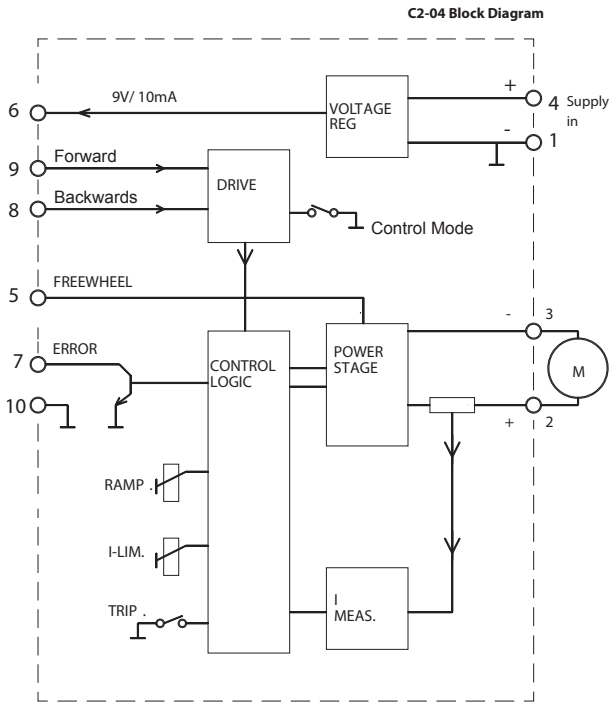
The current limitation is double acting. Firstly, there is a continuous and adjustable current limit, which decreases the motor voltage if the current exceeds the adjusted value. Secondly, there is settable trip feature that cuts the motor voltage if the current limit value is exceeded (after trip delay 2 ms). After trip the motor can only be started in the opposite direction. Additionally the C2-04 doubles the adjusted current value for 0.3 seconds during start-up to ensure sufficient power to overcome the start-up friction.

FEATURES

- Soft start-up
- Adjustable acceleration ramp
- Trip or continuous current limit
- Adjustable current limit
- Two control modes
- Freewheel option
- Dynamic braking
- High momentary load capacity
- High efficiency
- Easy interfacing
- Rail base fittable

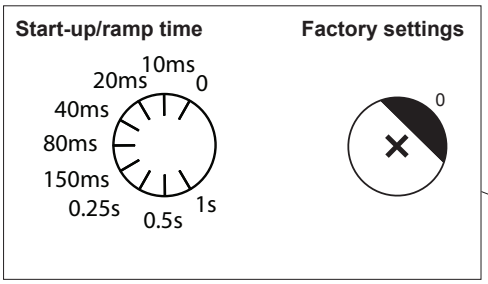
TECHNICAL DATA

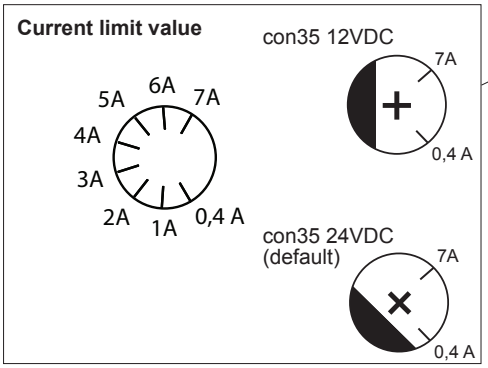
Supply	12-32 VDC (filtered, max. ripple <30% @ full load)
Over voltage protection	40 V
Idle current	Approx. 30 mA
Driving current	2.7 A continuous
	4.0 A 50/50%
Current limit	0.5 ... 7 A
	1.0 ... 14 A during start-up
Current trip delay	2 ms
Start delay	5 ms
Stop delay	5 ms
Direction change time	20 ms
Voltage loss	0.5 V (Im = 4 A)
Operating frequency	500 Hz
Ramp	0.1 - 1 s
Digital inputs	“off” @ U_{in} 4-30 V or open
	“on” @ U_{in} 0-1 V
Error output	Max. 30 V 50 mA
Operating temp. (Ta)	-20 ... +70 ºC
Dimensions:	
Board	73 x 43 x 25 mm (L x W x H)
C2-04DIN (DIN version)	90 x 46 x 56 mm (L x W x H)
C2-04BOX (box version)	102 x 73 x 47 mm (L x W x H)
Weight	Approx. 40 g (Board alone)

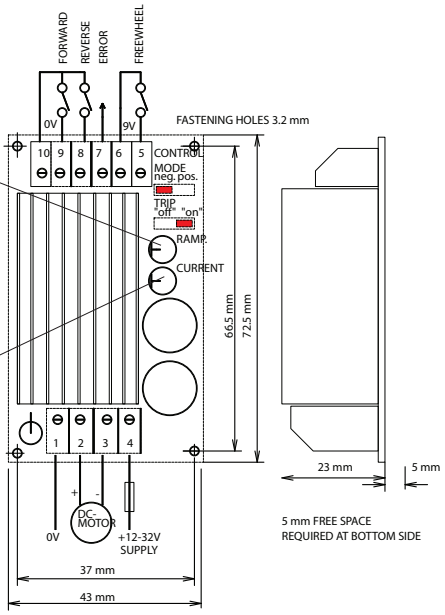


General

Pin 1: Supply GND
Pin 2: Actuator +
Pin 3: Actuator -
Pin 4: Supply + (12-32VDC)
Pin 5: Freewheel
When this pin is pulled high, the motor runs free, i.e. as if it was electrically disconnected. This signal overwrites pin 8 and 9.
Pin 6: 9V output; max. 10 mA.
Can be used as source for inputs (pins 5, 8 and 9).
Pin 7: Error
This pin is pulled low when the current limit function is activated. This is an open collector output, max. 50 mA.
External pull-up (10 K Ohm) may be required.
Pin 8/9: Backward/Forward
These pins are used to activate actuator backwards and forward.
Please refer to description of “Control Mode” on page 3.
Pin 10: GND



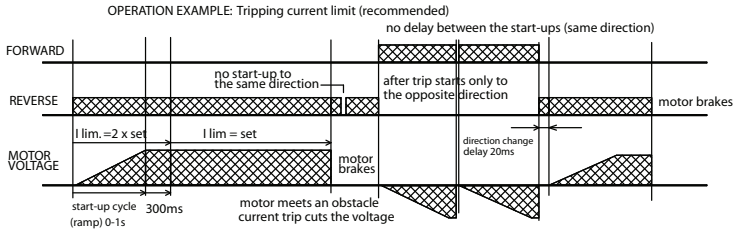


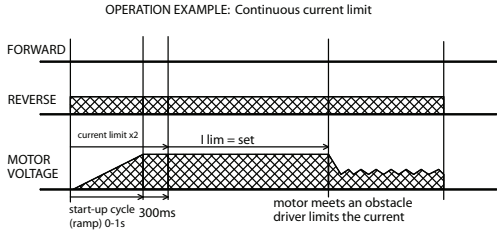


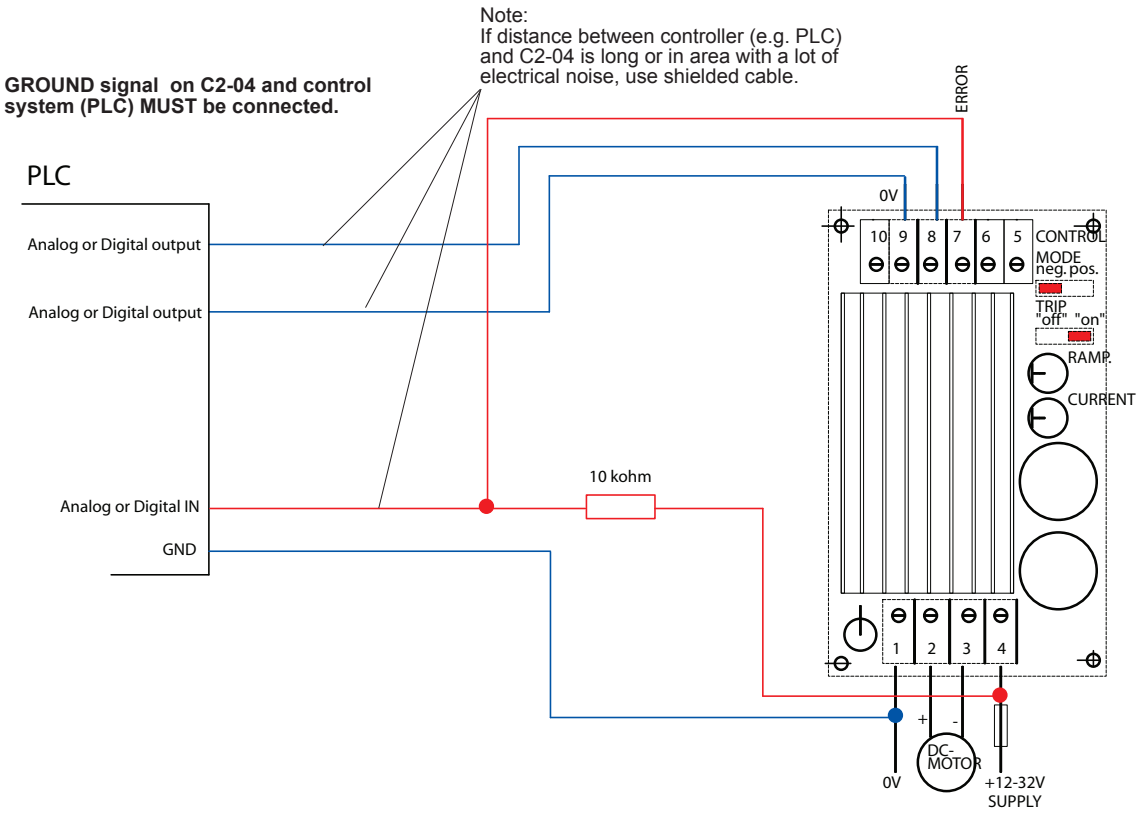
Control mode
When put in mode “neg” is when a negativ (ground) signal is put on pin 8 and 9 to run motor.
When using “neg” mode, then pin 10 can be used as the negative supply.
When put in mode “pos” is when a positive (+)signal is put on pin 8 and 9 to run motor “backward” and “forward”.
When using “pos” mode, then pin 6 can be used as the positive supply.
Current for pin 8+9 is <1 mA when active.

Current limit mode (TRIP)
On = tripping limit (recommended, default)
Off = continuous limit

Please refer to figures below.







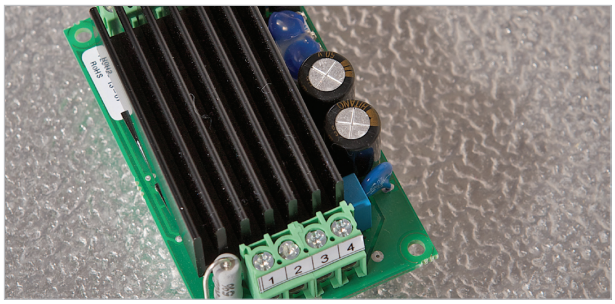
Warnings and recommendations

- If C2-04 goes into “overcurrent” mode, it is only possible to run motor in opposite direction
- Please adjust the max. current level to be 10% higher than maximum current during running the actuator. This gives best conditions for long motor and actuator mechanical lifetime.
- It is very important to ensure that the power supply for the controller is capable of supplying sufficient current - otherwise the controller and/or the actuator may be damaged.
- Doublecheck correct polarity of power supply.
  If wrong connected, the C2-04 will be damaged.
- Attention!
  Driver has no fuse in it.
  Use external fuse according to application (1-4A).

concens
- excellent electric actuators

User Manual
C2-15
Control and protection of linear actuator con50

Version 1.2 - September 2011



INTRODUCTION

C2-15 is developed for controlled ON-OFF driving and direction change of the con50 actuator. C2-15 has advanced current limit features. It limits the motor current in start-up and jam-situations and in that way protects the motor and mechanics. C2-15 also has an error output indicating error/over current status.

The acceleration ramp time for start-up is adjustable to suit each application. In other words the motor voltage is slowly rised to give a smooth start-up. When the control is off, the motor is dynamically braked with so called short-circuit braking, i.e. the motor poles are connected together. The reverse and forward commands can be set with positive and negative control.

The freewheel command sets motor run free. Freewheel overrides forward and backwards commands.

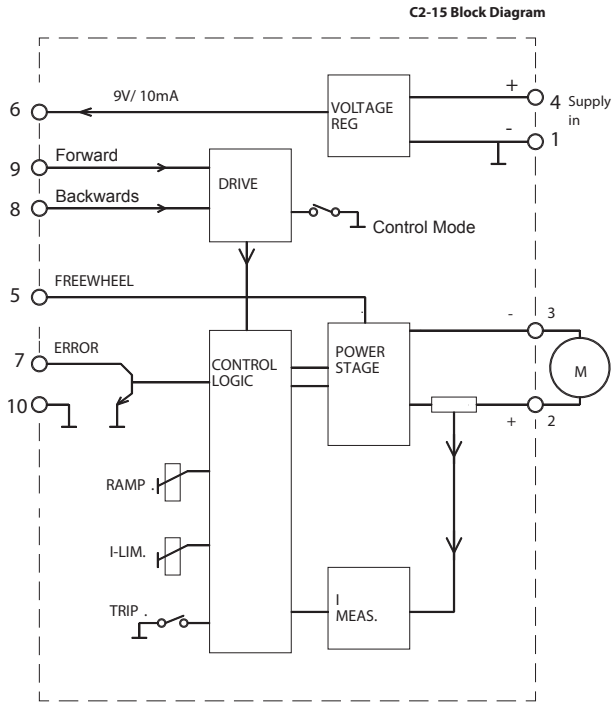
The current limitation is double acting. Firstly, there is a continuous and adjustable current limit, which decreases the motor voltage if the current exceeds the adjusted value. Secondly, there is settable trip feature that cuts the motor voltage if the current limit value is exceeded (after trip delay 2 ms). After trip the motor can only be started in the opposite direction. Additionally the C2-15 doubles the adjusted current value for 0.3 seconds during start-up to ensure sufficient power to overcome the start-up friction.

FEATURES

- Soft start-up
- Adjustable acceleration ramp
- Trip or continuous current limit
- Adjustable current limit
- Two control modes
- Freewheel option
- Dynamic braking
- High momentary load capacity
- High efficiency
- Easy interfacing
- Rail base fittable

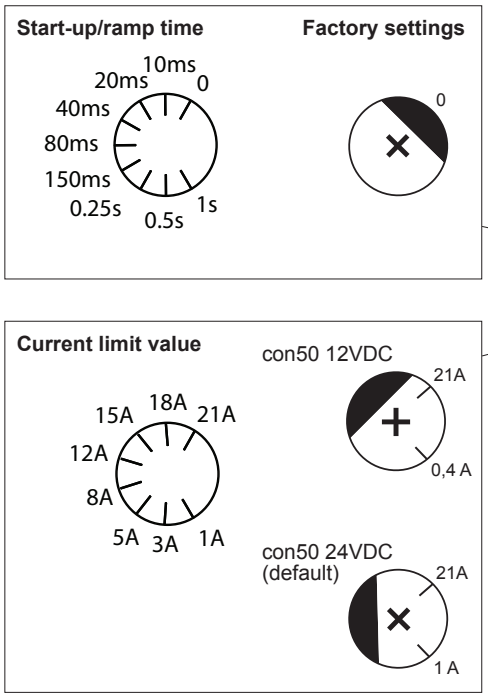
TECHNICAL DATA

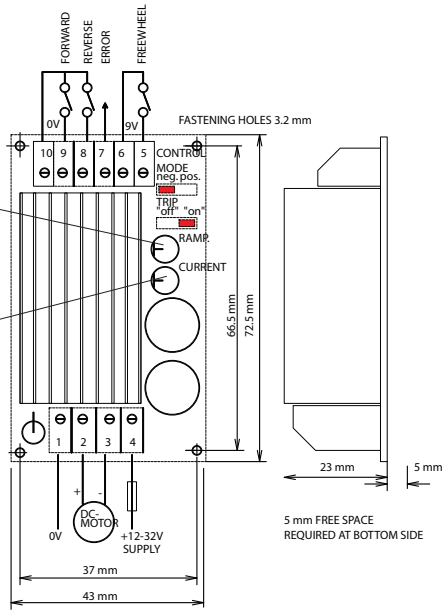
Supply	12-32 VDC (filtered, max. ripple <30% @ full load)
Over voltage protection	40 V
Idle current	Approx. 30 mA
Driving current	10 A continuous
	15 A 50/50%
Current limit	1 ... 21 A
	2 ... 42 A during start-up
Current trip delay	2 ms
Start delay	5 ms
Stop delay	5 ms
Direction change time	20 ms
Voltage loss	0.5 V (Im = 15 A)
Operating frequency	500 Hz
Ramp	0.1 - 1 s
Digital inputs	“off” @ U_{in} 4-30 V or open
	“on” @ U_{in} 0-1 V
Error output	Max. 30 V 50 mA
Operating temp. (Ta)	-20 ... +70 ºC
Dimensions:	
Board	73 x 43 x 25 mm (L x W x H)
C2-04DIN (DIN version)	90 x 46 x 56 mm (L x W x H)
C2-04BOX (box version)	102 x 73 x 47 mm (L x W x H)
Weight	Approx. 70 g (Board alone)



General

Pin 1: Supply GND
Pin 2: Actuator +
Pin 3: Actuator -
Pin 4: Supply + (12-32VDC)
Pin 5: Freewheel
When this pin is pulled high, the motor runs free, i.e. as if it was electrically disconnected. This signal overwrites pin 8 and 9.
Pin 6: 9V output; max. 10 mA.
Can be used as source for inputs (pins 5, 8 and 9).
Pin 7: Error
This pin is pulled low when the current limit function is activated. This is an open collector output, max. 50 mA.
External pull-up (10 K Ohm) may be required.
Pin 8/9: Backward/Forward
These pins are used to activate actuator backwards and forward.
Please refer to description of “Control Mode” on page 3.
Pin 10: GND





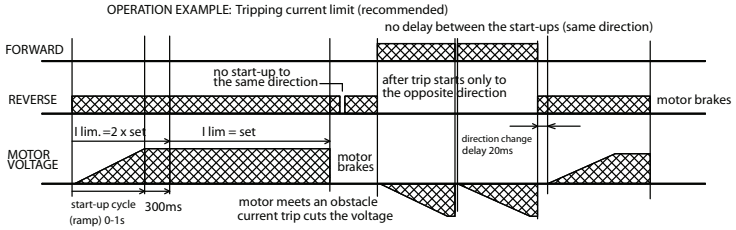
Control mode

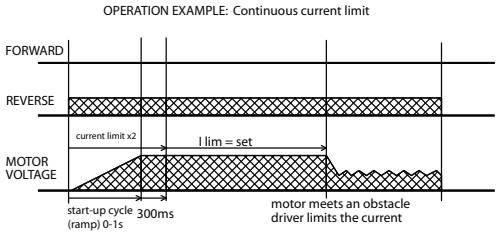
When put in mode “neg” is when a negativ (ground) signal is put on pin 8 and 9 to run motor.
When using “neg” mode, then pin 10 can be used as the negative supply.
When put in mode “pos” is when a positive (+)signal is put on pin 8 and 9 to run motor “backward” and “forward”.
When using “pos” mode, then pin 6 can be used as the positive supply.
Current for pin 8+9 is <1 mA when active.

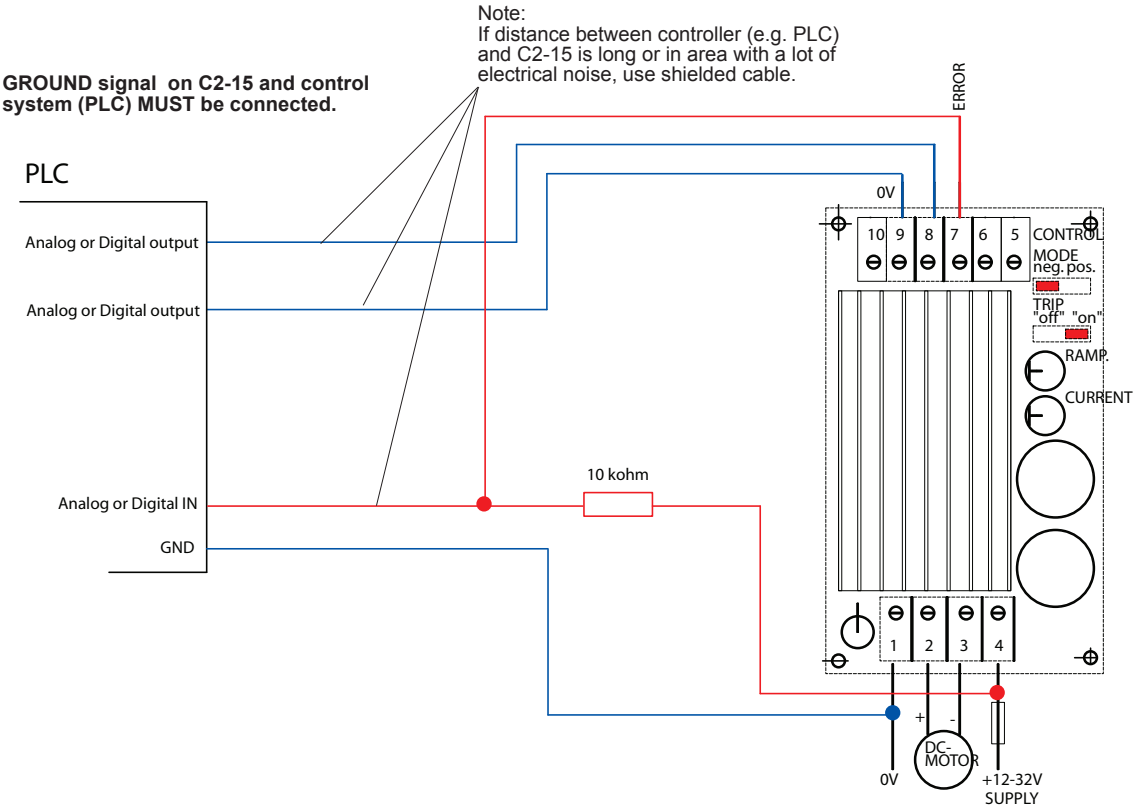
Current limit mode (TRIP)

On = tripping limit (recommended, default)
Off = continuous limit

Please refer to figures below.







Warnings and recommendations

- If C2-15 goes into “overcurrent” mode, it is only possible to run motor in opposite direction
- Please adjust the max. current level to be 10% higher than maximum current during running the actuator. This gives best conditions for long motor and actuator mechanical lifetime.
- It is very important to ensure that the power supply for the controller is capable of supplying sufficient current - otherwise the controller and/or the actuator may be damaged.
- Doublecheck correct polarity of power supply.
  If wrong connected, the C2-15 will be damaged.
- Attention!
  Driver has no fuse in it.
  Use external fuse according to application (1-15A).

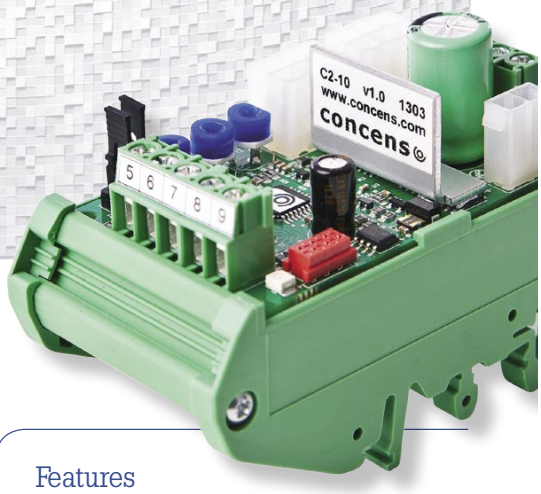
GB

DATA SHEET

C2-10

Control and protection of electric actuators

concens
- excellent electric actuators



C2-10

C2-10 is developed for controlled ON-OFF driving and direction change of the Concens actuators. C2-10 has advanced current limit features. It limits the actuator current in start-up, braking and jam-situations and in that way protects the motor and the mechanics. C2-10 also has a fault in- and output which indicates error/over-current status and can be used to stop the actuator (for example if an emergency-stop switch is used).

The acceleration and deceleration ramp times are individually adjustable to suit each application. In other words the motor voltage is controlled to give a preferred smooth start and stop. When the C2-10 controller is without power, the motor is dynamically braked with so called short-circuit braking, i.e. the motor poles are connected together. The reverse and forward input can be set to work with negative or positive voltage by moving a jumper.

C2-10 has a 'trip' feature that cuts the motor voltage if the current limit value is exceeded (after trip delay of 2ms). After trip the motor can only be started in the opposite direction. Additionally the C2-10 provides 'kick-start' which means 100ms at full power (100%PWM). Current limit during kick-start is up to 35A.

If the actuator is stopped without going into trip mode, then the C2-10 controller will allow 50% higher current from start and until 500ms after ending acceleration ramp (see timing figure).

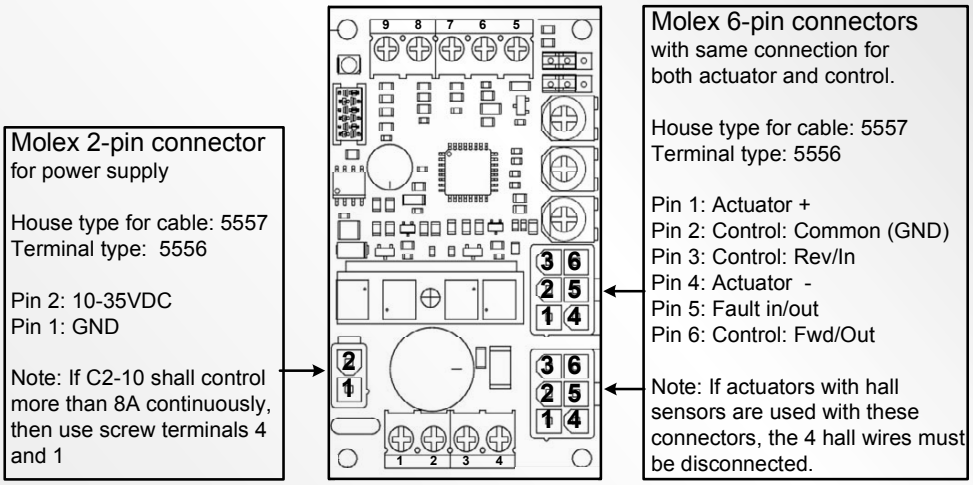
Features

- Adjustable Soft start (acceleration ramp)
- Adjustable Soft stop (deceleration ramp)
- Adjustable current limit
- Two control modes
- High momentary load capacity
- High efficiency
- Easy interfacing to PLC etc.
- Connectors and terminals for actuators, control and power
- DIN-rail fittable
- Status LED

Technical Data

Supply	10-35 VDC (filtered max ripple <30%@full load)
Over voltage protection	40 V
Idle current	Approx. 15 mA
Driving current	10 A continuous, 16 A with duty cycle 50% Max 16 A on duty 2 min
Current limit	0,5... 16 A
Current trip delay	20 ms
Start delay	5 ms
Voltage loss	0,5 V (Im = 4A)
Operating frequency	2000 hz
Ramps	0,1 ... 2,5 s
Digital inputs	'High' @ Uin 4 V → supply voltage, 'Low' @ Uin 0 V → 1 V
Operating temp.	(Ta) -20 ... +70 degC

FIG. 1 WIRING FOR C2-10



General

LED signals: Fast blink: Current trip
Four blinks: Overvoltage
Solid light: Overtemp

Current limit during start ramp and 500ms thereafter is current limit plus 50%.

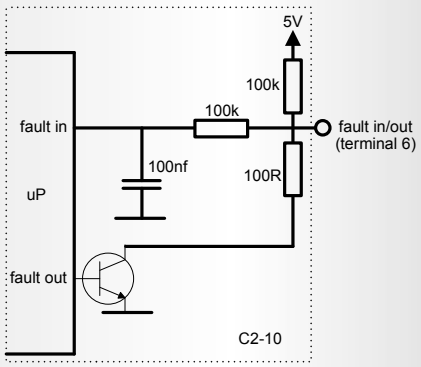
After trip the motor can only be started in the opposite direction. Additionally the C2-10 after trip provides 'kick-start', which means 100ms at full power (100%PWM). Current limit during kick-start is up to 35A.

The fault terminal is both input and output (see fig. 2). During normal operation the signal is pulled high to 5 V on the C2-10 board in series with a 100k resistor. When a fault occurs the fault terminal changes to low voltage (GND via 100R resistor).

Terminals

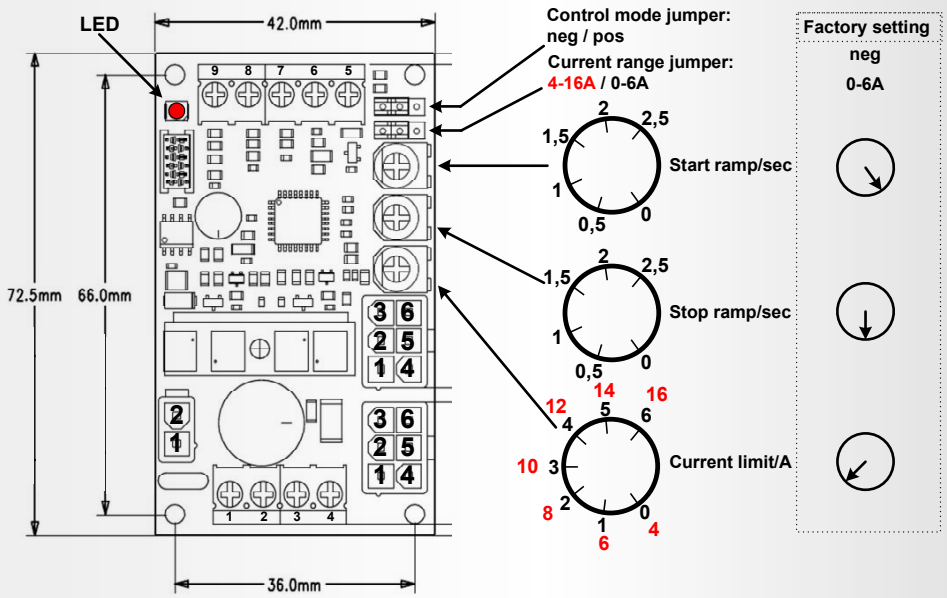
1 Supply GND
2 Supply + (10-35 VDC) fuse required
3 Actuator –
4 Actuator +
5 +5 V output for control-use max. 10 mA load
6 Fault in- and output
7 Reverse (Rev/In) signal input (0,5 mA)
8 Forward (Fwd/Out) signal input (0,5mA)
7+8 Used to activate the actuator back- and forward. Please refer to description of 'Control mode' on page 3
9 GND for control-use (not to be used as supply input)

FIG. 2 CIRCUIT DIAGRAM



C2-10

FIG.3 SETTINGS AND MECHANICAL DIMENSIONS



Control mode

When jumper is put in mode 'neg' (left hand side) then a negative (GND) signal is put on terminal 7 and 8 to run motor.

When using 'neg' mode, then terminal 9 can be used as the negative supply.

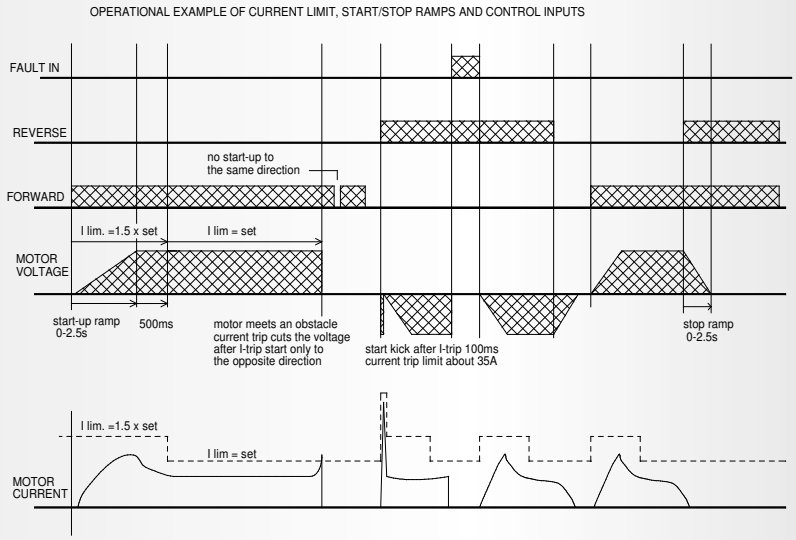
When jumper is put in mode 'pos' (jumper in right side) then a positive (> 4 V) signal is put on terminal 7 and 8 to run motor.

When using 'pos' mode, then terminal 5 can be used as the positive supply.

NOTE: When using the connectors for remote control, then the jumper MUST be in 'neg' mode (left side).

Input current for reverse & forward control is 0.5mA.

FIG. 4 TIMING DIAGRAM



C2-10

C2-10 (board alone)
73 x 43 x 25 mm (L x W x H)

C2-10-DIN (DIN rail version)
90 x 46 x 56 mm (L x W x H)

C2-10-BOX (box version)
102 x 73 x 47 mm (L x W x H)

C2-10-BOX-XL (XL box version)
104 x 104 x 46 mm (L x W x H)

Warnings and recommendations

- If C2-10 goes into "trip" (overcurrent), it is only possible to run actuator in opposite direction.
- Please adjust the max. current to be 10% higher than maximum current during running the actuator. This gives the best conditions for long motor and actuator mechanical and electrical lifetime.
- It is very important to ensure that the power supply for the controller is capable of supplying sufficient current – otherwise the controller and the actuator may be damaged.
- Doublecheck correct polarity of power supply. If wrong connected, the C2-10 will be damaged.
- Attention! Driver has no fuse in it. Use external fuse according to application (2 → 16A slow).
- Concens does not have any responsibility over the possible errors in this data sheet.
- Specifications are to be changed without notice.

User Manual

C2-20

ver 2,0

User Manual
C2-20

INTRODUCTION

C2-20 is a full H-bridge DC-motor controller. It is designed to work with con35 and con50 electrical in-line actuators in applications where some special functions are needed. It is also possible to use this device with actuators that gives pulses with hall sensors. C2-20 has adjustable acceleration and deceleration ramps, which make the smooth starts and stops possible .

Adjustable current limits in both directions protects motor against overcurrent and it can also be used as an endstop. This device has also two adjustable speeds, whereas the 2nd is used in the learning mode to count the number of hall pulses in a full stroke of the actuator. This enables an accurate positioning of the actuator so it is working as a servo.
Control input is a voltage. The stroke of the actuator is controlled by sending a DC voltage between 0-10,0 Volt to the C2-20. Adjustments and settings: Adjustments and parameter setting like current limit value, ramp times, speed-2 value and all other needed parameters can be set with C2-PROG interface unit, or USB cable with a "dongle" connected to a PC or LAPTOP. This enables the accurate copying of settings and reliable operation of the device in demanding environment. See page 2 for more details.

FEATURES

- Fast change of direction
- Soft start-up, acceleration ramp
- Settable current limit
- Trip or continuous current limit
- High efficiency
- Dynamic braking
- High momentary load capacity
- Rail base fittable
- Freewheel option
- Two control modes

TECHNICAL DATA

Supply voltage	9-35VDC
Actuator current continuous max	15A (Ta<60°C)
Actuator current	max 20A (short time)
Current limit adj.	0.1-20A
Overheat limit	110°C
PWM frequency	2kHz
Hall input freq.	max 1khz
Input control logic:	
"pos" ON=4-30V, OFF=0-1V or open	
Control input impedances typ.	30kohm
Motor and supply connectors:	2.5mm wires max
Control connectors:	1mm wires max
Dimensions	42x72x25mm
Dimensions in DIN-rail base	45x80x45mm
CE-tested for industrial enviroment (EMC)	
Weight	75g
Operating temp (Ta)	0-60°C

WIRING AND SETTINGS FOR C2-20

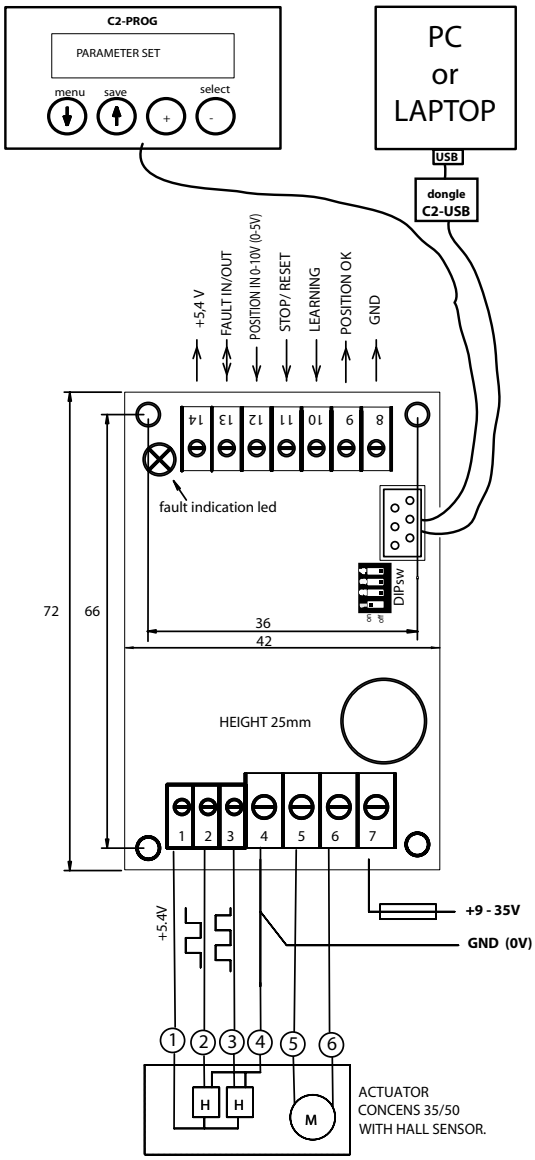
Power supply min-max. 9-35Vdc filtered DC
Recomended ripple lower than 20 %.

First run the learning cycle and then do the
settings with serial interface unit "C2-PROG" or PC or LAPTOP

1/15 **Speed** - 35 - 100% <=> 35-100 (100)
2/15 **Learning speed** - 35 - 100% <=> 35-100 (50)
3/15 **I-limit** "out" 0,1 - 20,0A <=> 1-200 (20)
4/15 **I-limit** "in" 0,1 - 20,0A <=> 1-200 (20)
Notice! current limits are 1.5 times
higher during **start ramp**.
5/15 **I-trip enable** 0/1 <=> off/on (1)
6/15 **I-trip delay** 0 - 255ms <=> 0 - 255 (5)
7/15 **Load compensation** 0 -255 <=> 0 - 255 (0)
8/15 **Pulse lost timeout** 1 - 5s <=> 1 - 5 (2)
9/15 **Start value** 0 - 50% <=> 0 - 50 (30)
10/15 **Hour/Start count** reset 0 - 1, reset when set to 1
11/15 **Brake area** 0,0 - 20,0% <=> 0 - 200 (50)
12/15 **Dead zone** 0,0 - 10,0% <=> 0 - 100 (10)
13/15 **Range scale in** + 0,0 - 50,0% <=> 0 - 500 (7)
14/15 **Range scale out** - 0,0 - 50,0% <=> 0 - 500 (70)
15/15 **Start ramp** 0,1 - 5s <=> 0 - 500 (100)

- **Speed setting** limits the maximum speed.
- **Learning speed** sets the learning cycle speed. (pict. 2)
- **I-limits** are individual for in and out directions
- **I-trip** enables the trip function, so that motor will be shut
down when the set I-lim is exceeded.
- **I-trip** delay defines the reaction time for trip
- **Load** compensation increases the torque at low speed.
Notice that over compensation will cause oscillation
and twiching of the motor.
- **Pulse lost time-out** stops motor after the set time without pulses.
- **Brake area** is proportional value of the full stroke.
In low speed application good value is near 1%, and in high
speed solution it can be near to 20% (pict. 1)
- **Dead zone** is steady area, suitable size of this zone depends
on the mechanical accuracy of the system, this value is also
a ratio of the full stroke (%) (pict 1.)
- **Start value** is a voltage level for start (% of full),
this ensures that the motor gets an adequate voltage
to start properly, but notice that too high start level will
cause motor vibration (pict 1).
- **Range scale** adjustment is for scaling of the stroke, with this can
the scale be adjusted after learning. The in and out ends are
individually scaleable to get the suitable mechanical stroke for
set value from 0-5V (pict. 3)
- **Hour/Start** count reset makes possible to set the hour/start counter to zero
- **Start ramp** limits the acceleration speed when motor starts.

WIRING AND SETTINGS FOR C2-20 ver 2,0



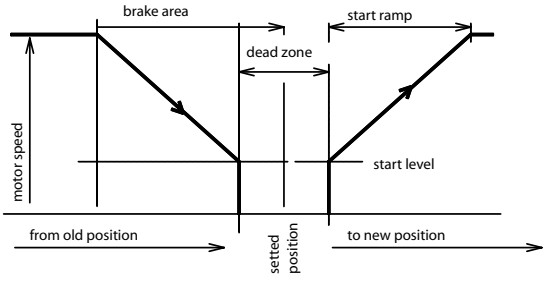
TERMINALS:

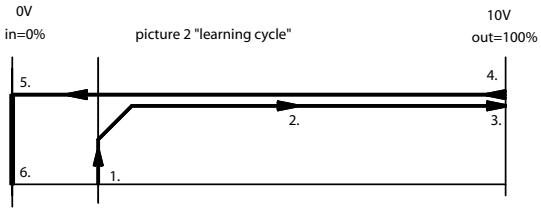
+5,4V - voltage output, max 10mA
FAULT IN/OUT- pnp open collector max 100mA
can be connected to other C2-20 modules, thereby all modules connected will stop if one module sends a FAULT signal. If wirelength is more than 1 meter, a 10kohm pull-up resistor connected to supply is recommended.
POS. SET - analog input 0-10V (0-5V if SW1 on 4 pole SW is OFF), Rin 30k
STOP/RESET - digital in. (>4V and max supplyvoltage) Rin 47k. Stops the motor and resets any fault.
LEARNING - digital in. (>4V and max supplyvoltage) Rin 47k, starts "learning".
POSITION OK - digital out 5 Volt through 1kohm when wanted position is reached, and low during movement.
Note: if "Brake Zone" is very long, then **POSITION OK** signal can be difficult to reach, since the motor only gets very low power to reach within the "dead zone".
GND - signal gnd, same potential as terminal 4.

Cables:	**con35 cable**		**con50 cable**	
	Black	**Grey**	**Black**	**Grey**
1 Hall +	**red**	**red**	**red**	**red**
2 Hall A	**yellow**	**yellow**	**yellow**	**yellow**
3 Hall B	**green**	**green**	**green**	**green**
4 Hall GND	**orange**	**blue**	**blue**	**blue**
5 Actuator -	**black**	**white/grey**	**blk/pur**	**white/grey**
6 Actuator +	**brown**	**bwn/pur**	**bwn/or**	**bwn/pur**

LED blinking signals
I-limit occurs = fast blinking
Overtemp = slow blinking
Pulse lost = short, mid, long, short mid long...
Over voltage = burst - pause etc.

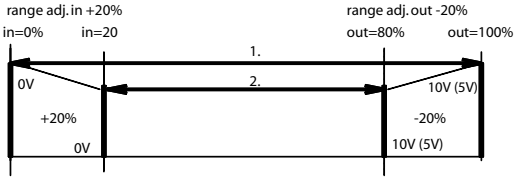
picture 1 "positioning window"





1. start learning by giving an impulse to learn input (10)
2. motor starts to run "out" direction with learn speed
3. current limit stops the motor when mechanical end is reached
4. motor starts to "in" direction and makes a full stroke. During stroke the pulse counter measures the range.
5. motor reaches the mechanical end "in", and current limit stops the motor.
6. Device stores full range value and is ready for use

picture 3 "range scaling"

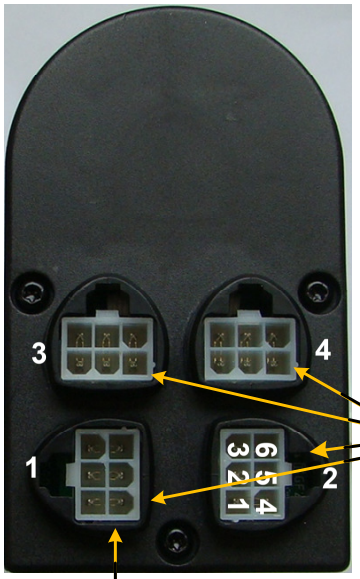


1. original learned range = mechanical full range equals the signal range 0-10V
2. modified range example:
If range scale in = +20% and
range scale out = -20%.
now stroke of actuator is compressed to:
positioning set value 0V = 20% position
positioning set value 10V (5V) = 80% position

C3-CON1X

1: Motor (+)
2: Button Common
3: Button Down/in
4: Motor (-)
5:
6: Button Up/out

C3-CON1 / C3-CON2 / C3-CON3 - C3-CON4

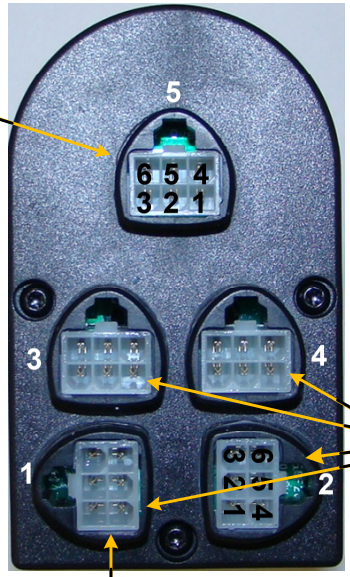


1: motor (+)
2: Hall +5VDC
3: Hall -1
4: Motor (-)
5: Hall GND
6: Hall -2

Connector 1 are combined motor- and programming port.

C3-CON1W / C3-CON2W / C3-CON3W - C3-CON4W

1: Emergency (+)
2: +5VDC
3: Button signal
4: Battery (+)
5:
6: Ground

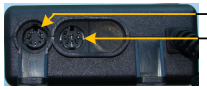


1: motor (+)
2: Hall +5VDC
3: Hall -1
4: Motor (-)
5: Hall GND
6: Hall -2

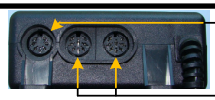
Connector 1 are combined motor- and programming port.

Logic Data Controlboxes

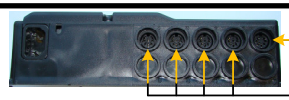
C1-CBX1



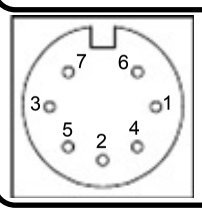
C1-CBX2



C1-LogicB-4

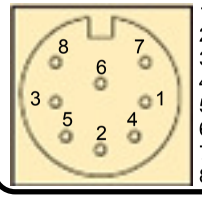


Handset connector



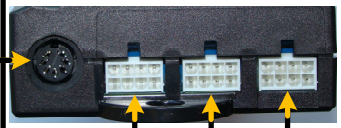
1: RxD
2: HS3
3: HS1
4: HS4
5: HS2
6: TxD
7: +5V
Shell: Ground

Motor socket



1: Motor +
2: Motor -
3: +5V
4: Motor -
5: Ground
6: Hallsensor B
7: Motor +
8: Hallsensor A

Logic data COMPACT-3



Motor socket

1: Hallsensor A
2: +5V
3:
4: Motor +
5: Hallsensor B
6:
7: Ground
8: Motor -

Actuator-cable colours

	con35 cable		con50 cable	
	Black	Grey/Black	Black	Grey
	6 wires	8 wires	8 wires	8 wires
+5V (Hall)	red	red	red	red
Hall A	yellow	yellow	yellow	yellow
Hall B	green	green	green	green
Ground	orange	blue	blue	blue
Motor -	black	white/grey	blk/pur	white/grey
Motor +	brown	bwn/pur	bwn/or	bwn/pur

Connectors/cables/colours

SETEC® tecnica cinematica

TORINO

Direzione Generale e Stabilimento di Produzione - Headquarter and Production Plant:

Via Mappano, 17 - 10071 Borgaro T.se (TO)
T +39 011 451 8611 (centr. r.a.) - F +39 011 470 4891
setec.to@setec-group.it

MILANO
Via Meccanica, 5
20026 Novate (MI) - Z. I. Vialba
T +39 02 356 0990 - 382 01 590 (r.a.)
F +39 02 356 0943
setec.mi@setec-group.it

BOLOGNA
Via Del Lavoro, 6/A
40051 Altedo (BO)
T +39 051 871 949 (3 linee r.a.)
F +39 051 870 329
setec.bo@setec-group.it

PADOVA
Via Secchi, 81
35136 Padova
T +39 049 872 5983
F +39 049 856 0965
setec.pd@setec-group.it

FIRENZE
Via Galileo Galilei, 3
50015 Bagno a Ripoli - Grassina (FI)
T +39 055 643 261
F +39 055 646 6614
setec.fi@setec-group.it

www.setec-group.it

EUROPEAN Power Transmission Distributors Association